

ABSTRACT OF THE DISCLOSURE

A quantum cascade laser 1, which generates infrared light or other light of a predetermined wavelength by making use of intersubband transitions in a quantum well structure, is arranged by forming, on a GaAs substrate 10, an AlGaAs/GaAs active layer 11 having a cascade structure in which quantum well light emitting layers and injection layers are laminated alternately. Also, at the GaAs substrate 10 side and the side opposite the GaAs substrate 10 side of active layer 11, is provided a waveguide structure, comprising waveguide core layers 12 and 14, each being formed of an n-type GaInNAs layer, which is a group III-V compound semiconductor that contains N (nitrogen), formed so as to be lattice matched with the GaAs substrate 10, and waveguide clad layers 13 and 15, each formed of an n⁺⁺-type GaAs layer. A quantum cascade laser, with which the waveguide loss of generated light in the laser is reduced, is thereby realized.